Distributed Mission Training (DMT)

Warfighter Training Research Division

AFRL

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AFRL/HEA

REPORT DOCUMENTATION PAGE

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AFRL/HEA Mission

Develop and transition technologies and methods to train warfighters to win

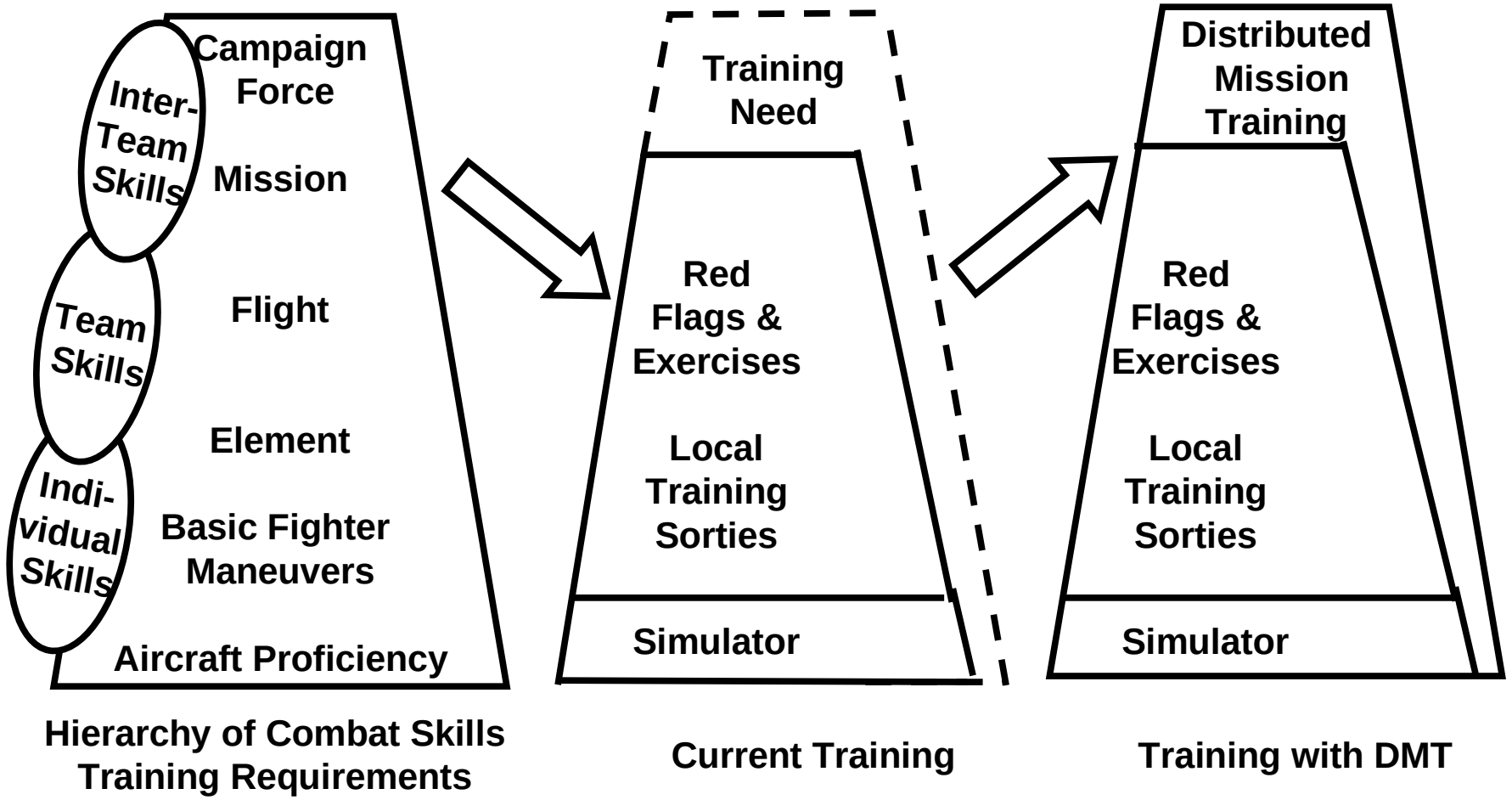
Peter Drucker: "The best way to predict the future is to create it"

Live Fly Training Constraints Growing

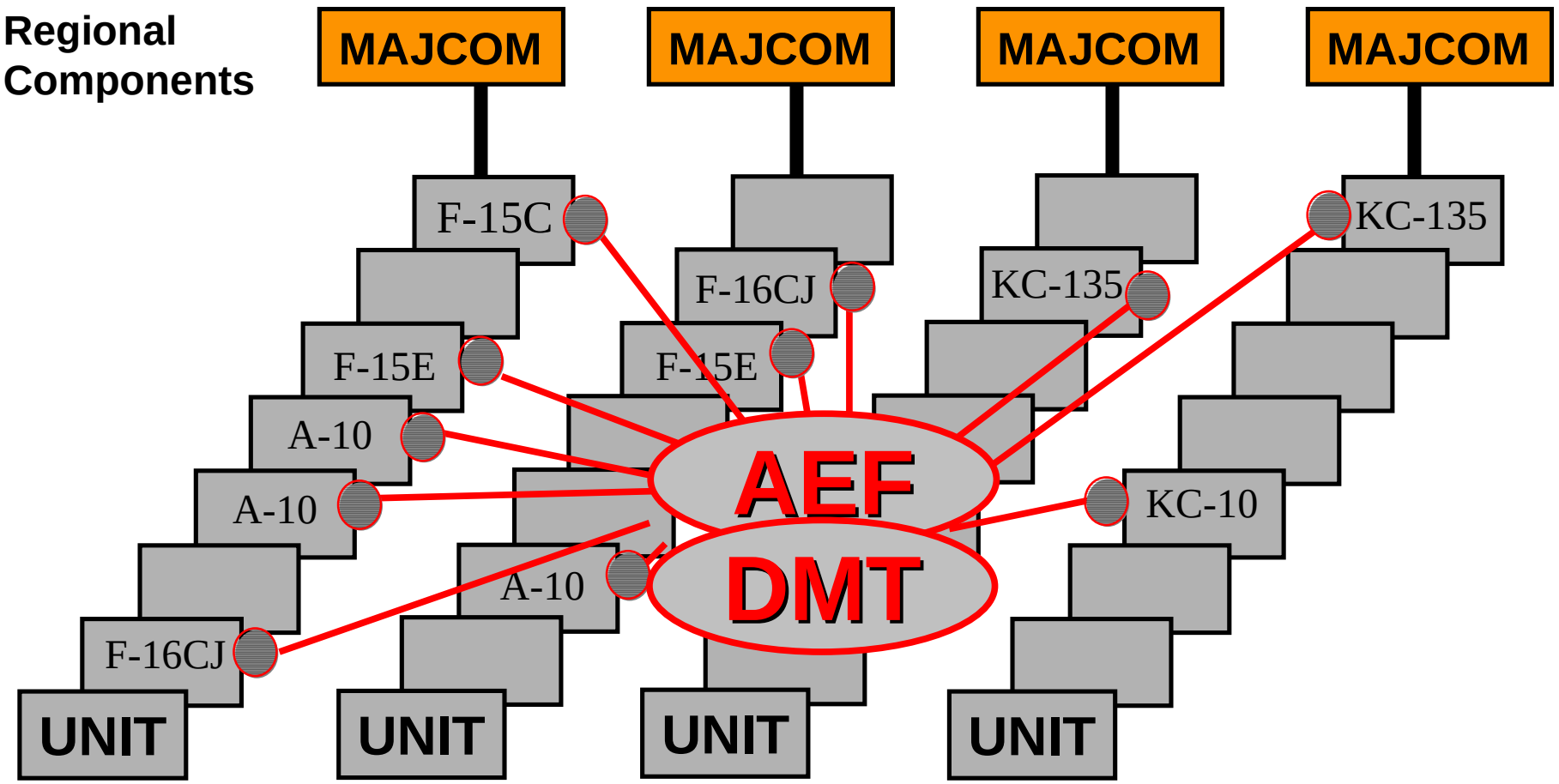
- **Resources and funding... Airspace, ranges, flying time**
- **Equipment and personnel… airframe wear, opstempo, perstempo**
- **Safety and security… live weapons employment, classified systems**

… modern weapons and employment concepts require extensive airspace, large ranges, and more composite training opportunities.

Current Training Constraints Prevent Full Mission Skills Training



DMT Ties Training Together for Air Expeditionary Forces



Distributed Mission Training Research and Development Program

Expeditionary Air Force Enabler

USAF EAF Director, MGen Cook's Statement on DMT

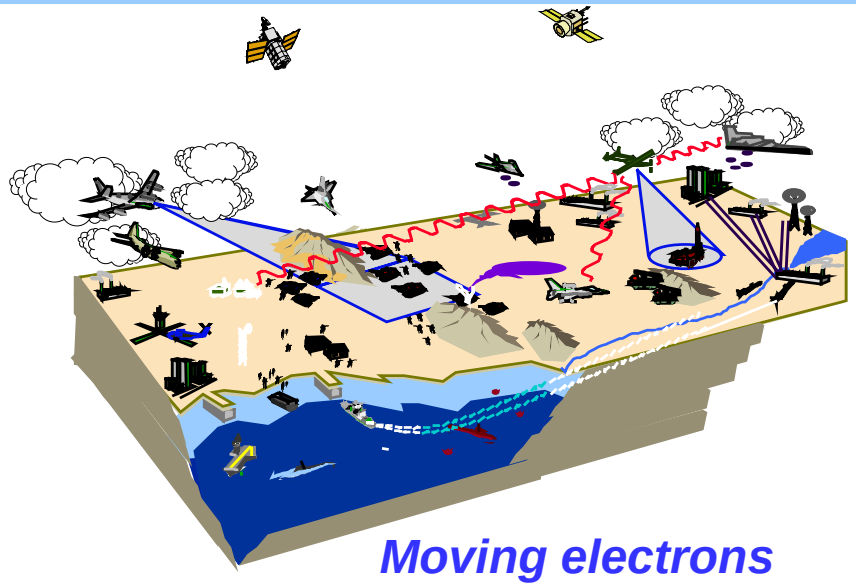
DMT for the AEF

- *AEF forces are geographically distributed*
- *Preparing these forces for expeditionary employment requires a detailed plan and a philosophy relying on DMT*
- *AEF is at the right point to capitalize on DMT*

AEF Training / DMT

What AEF really needs:

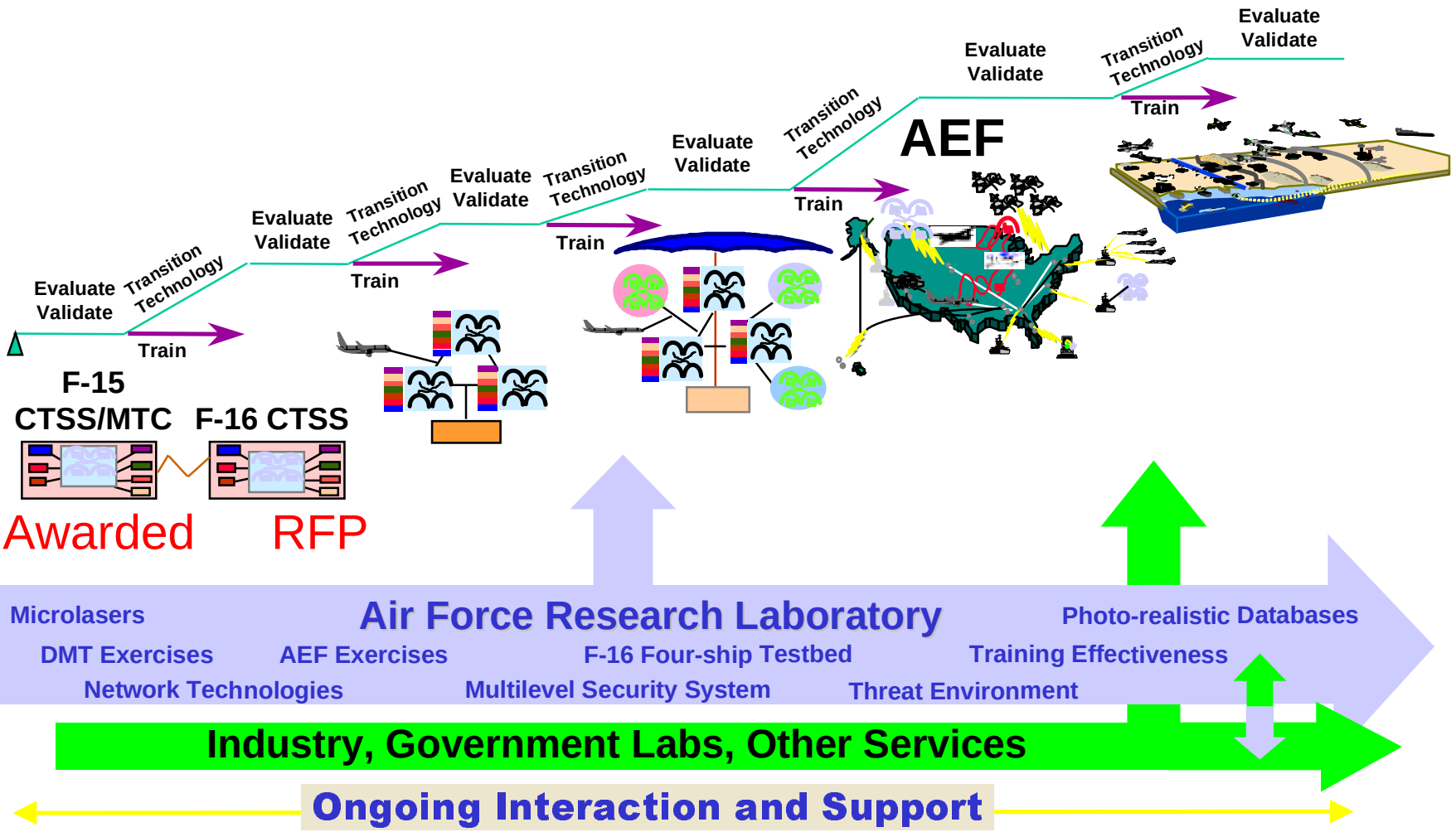
- Realistic, robust training system to compensate for loss of training resources (aircraft, flying time, etc)
- Full Sensor & C2 Representation
- Composite force operations
- Mission rehearsal
- Connectivity for disparate sites
- Sensor-Decision Maker-Shooter



Moving electrons not people

WAR IN A BOX
Integrated Battle-space
Geo-Specific Terrain
ISR Validated Threats
Weather Effect

Distributed Mission Training
Technology and Environment Evolution



CTSS - Commercial Training Simulation Services
MTC - Mission Training Center

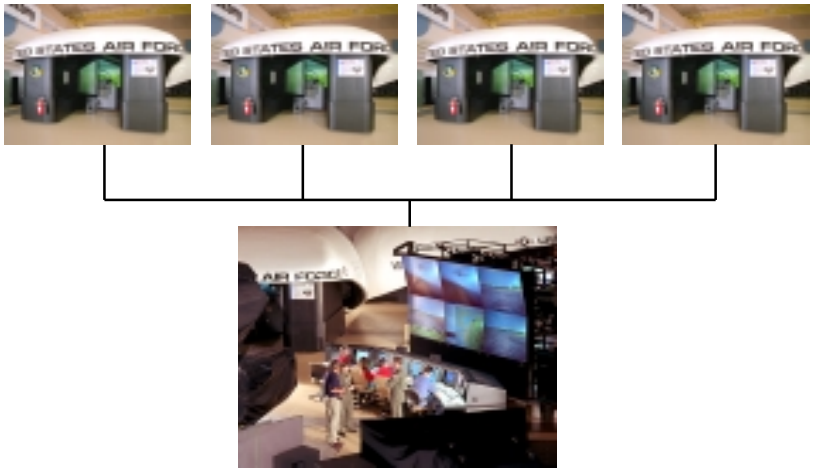
DMT Demonstration at AFA Convention

- **Deployed Systems (minimum configuration)**
  - **2 AFRL/HEA F-16C MultiTask Trainers (MTTs)**
    - » **With 360º Field of View Visual**
    - » **High Resolution, Photo-Realistic Nellis AFB Database**
    - » **Networked back to 2 Vipers at AFRL/Mesa**
  - **6 Screen Large Video Wall**
  - **Mission / Exercise Control Station**
  - **Large Smartboard® w/Briefing Room Interactive**

Desirable Additions to AFA Convention

- **On Site**
  - **UAV Simulator**
  - **Night Vision Training System (NVTS)**
- **Long Haul Network for Distributed Training**
  - **Theater Battle Arena (TBA)**
  - **TACCSF: F-15C, Red Air Stations & Constructive Forces**
  - **Mesa: A-10 MTT**
  - **AFRL, Brooks AFB AWACS training system**
  - **Thomson Training Systems UK**
  - **AWACS possible live downlink/uplink**
  - **AFSOC AC-130 Simulator**
  - **AFRL/HEA ANG A-10 Simulator**

DMT Program



Distributed Mission Training

Capabilities

- **Affordability**
  - **Reduced training system acq/sustain costs**
  - **Reduced flying hour programs**
  - **Reduced time to train**
- **Availability**
  - **Deployable, distributed full mission training**
  - **Train where the warfighter operates**
  - **Reduce PERSTEMPO stress**
- **Aging Aircraft** - **Reduced flying hours**
- **Safety** - **Reduced operator error accidents**
- **Readiness** - **Improved individual/team performance**
- **Validation**
  - **Improved validation tools**
  - **Improved data generation and evaluation**

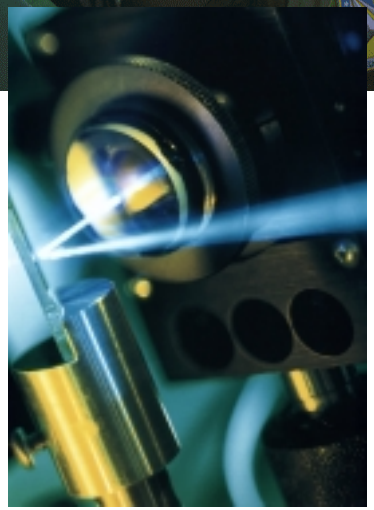
A System of Systems Goals

- **Effective, affordable training**
- **Fully integrated unit level ground-based training environment**
- **Validated techniques & technologies**
- **Realistic training environment**
- **Scaleable, tailorable training capability available at unit level**

Technology Challenges

- **High Resolution Visual Systems**
- **Multi-Level Security Manager**
- **Electronic Combat Environment**
- **Databases**
- **Information Technologies**
- **Interconnection Technologies**

High Resolution Visual System



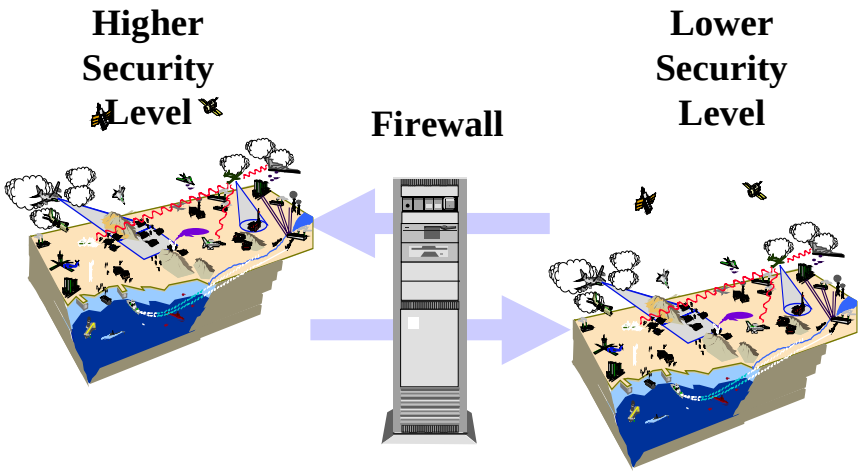
Warfighter Needs

- **Increase fidelity (field of view, scene complexity, resolution, contrast, and brightness) of simulations**
- **Increased visual acuity (20/20) to enable true human visual resolution for high precision missions**
- **Increased affordability, modularity and deployability of simulators**

Research Areas

- **Visual Displays**
- **Microlaser Projection systems**
- **Helmet Mounted displays**
- **3D Monitors**

Multi-Level Security



Warfighter Needs

- Interaction between simulators with different security classification levels
- Critical combat assets to be part of DMT environment
- Joint and Coalition DMT-based exercises and mission rehearsals

Research Areas

- Automated, real-time (60Hz) multi-level security system manager
- Latency impacts over long-haul networks in training scenarios

Electronic Combat Environment

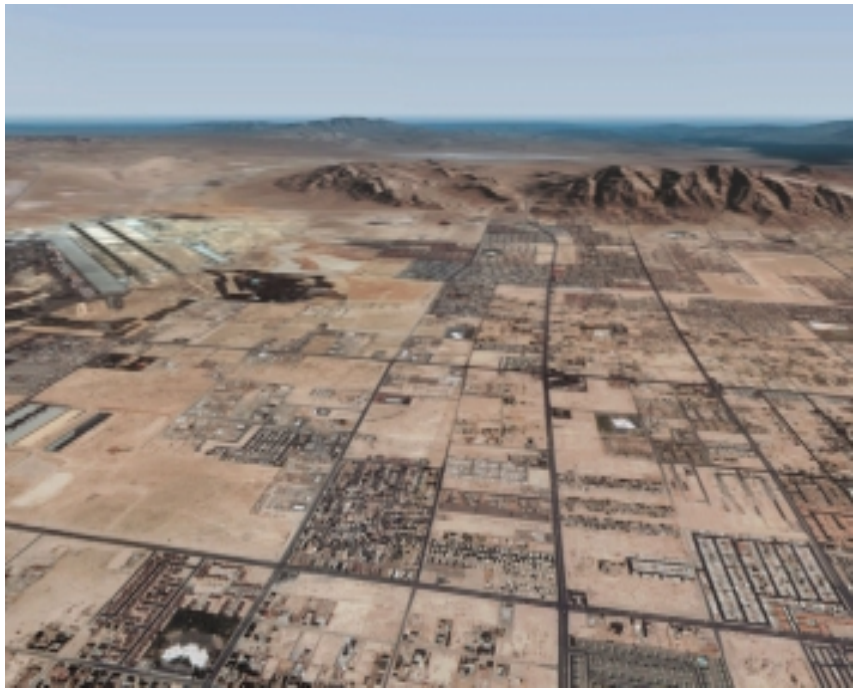
Warfighter Needs

- Realistic representation of real-world threats
- Comprehensive training at home station to enhance survivability in combat

Research Areas

- Integrate realistic, physics-based threat emitter models
- Real-time DMT threat environment that supports time-correlated signal and weapon system operations
- Realistic electronic combat environment with land-based, space-based, shipborne, and airborne systems
- Validated threat system able to exhibit real-world effects/behaviors

Databases/Database Generation



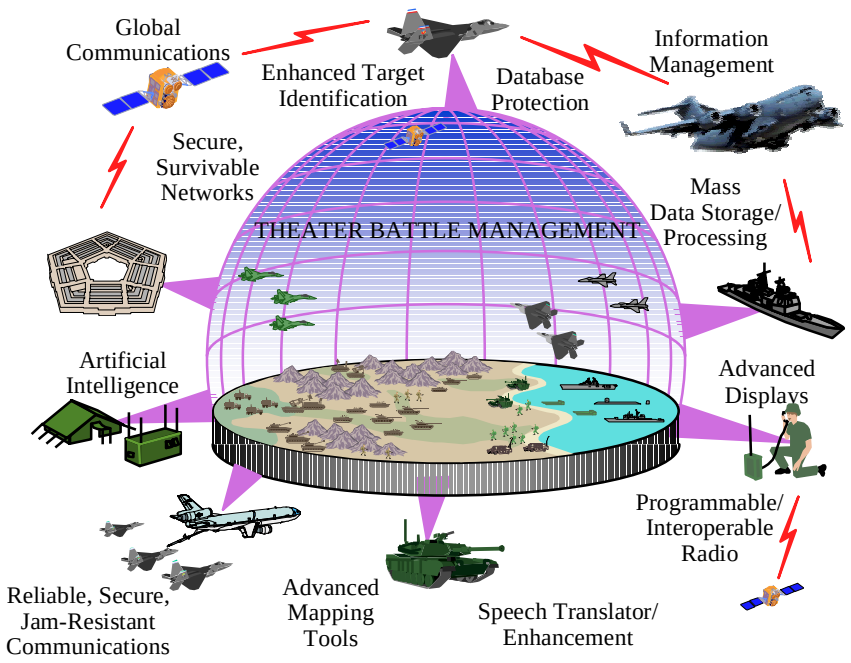
Warfighter Needs

- Correlated databases across all image generator types and across all visual and sensor types
- Accurate and correlated moving models and special effects
- Increased realism through actual representation of real-world environment in simulation

Research Areas

- Multispectral physics based data at the texal level
- Standards and interfaces for databases and image generation systems

Information Technology



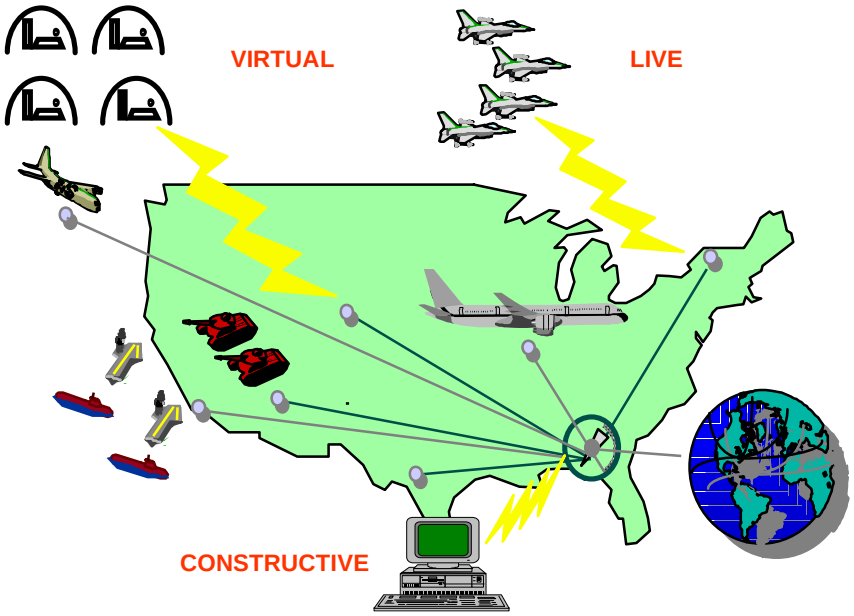
Warfighter Needs

- **Long-haul, High-fidelity Briefing / Debriefing Capability Providing Quality Performance Feedback Through**
- **Rapid Mission Planning Integrated Into DMT Environment**
- **Real Time Infusion of Intelligence (Intel) Information Into DMT**

Research Areas

- **Instructional tools such as eye-tracker playback and analysis, video capture, and automatic performance feedback**
- **Incorporation of space, air and information warfare in DMT environment for robust warfighter training**

Interconnection Technology



Warfighter Needs

- DMT Connections Enabling Real-time (60hz) Operations Without Compromising Training Capabilities (I.E. Latency Minimized)
- Secure DMT Networks
- Multi-national Connectivity & Tech Sharing
- Multiple Player / Site Inter-connectivity

Research Areas

- High Level Architecture Optimized for High Fidelity AF DMT Operations
- Bandwidth Requirements for DMT
- Latency Training Impacts Over Long-haul Networks in Training Scenarios
- Baseline Network Topology and Communication Protocols for DMT
- Live/Virtual/Constructive Interface

The Road Ahead

- **There is a Long Way to Go**
  - **Maintain Clear Focus on Providing Tailored Training and Education to the EAF**
  - **Incremental, Planned Integration of Technologies**
    - » **Partner With Industry to Develop Needed Technologies**

Questions and Comments

www.williams.af.mil